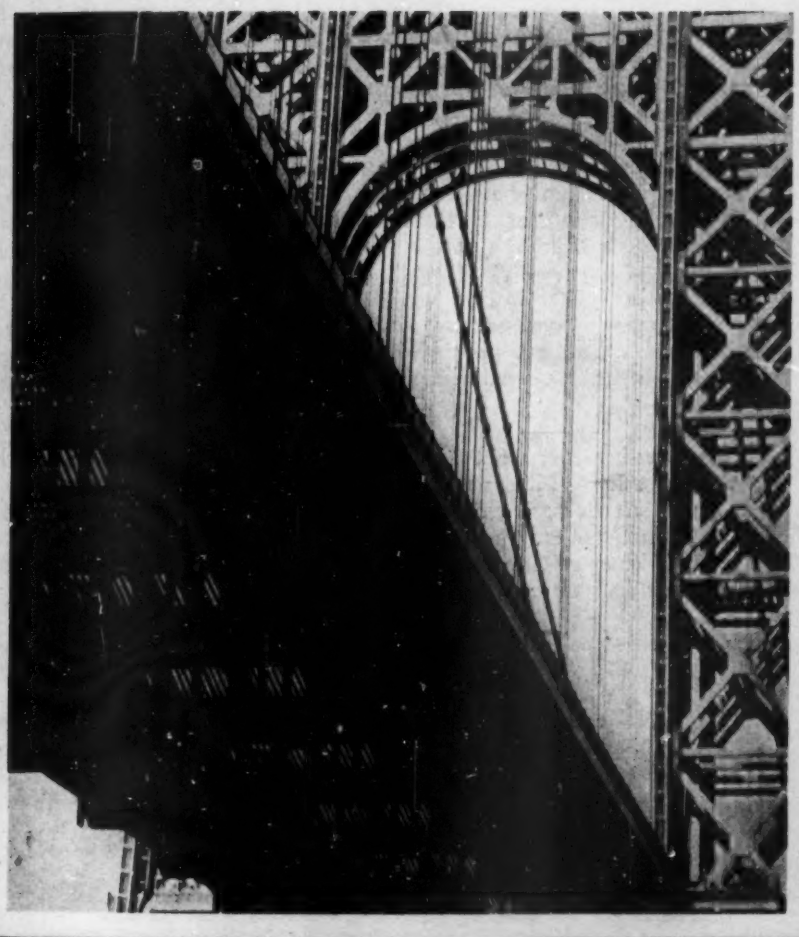
SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •



JUNE 29, 1935

Engineering

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The Weekly Summary of

Current Science

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DO YOU KNOW?

In proportion to body weight, women have larger brains than men.

More than 83 per cent. of the land of Kansas has been injured slightly or seriously by erosion of the soil.

A statistician reports that there have been over a million deaths from cancer in the United States in the past ten years.

It is estimated that Colorado has 417 billion tons of coal still unmined, or enough to supply the world for about 200 years.

Termites attacking a building will quickly die if the connection is broken between the building and the external soil moisture.

The idea of having glass show cases in front of a museum to attract visitors, as shops attract customers by their windows, is being tried in France.

Commercial basket makers use few materials aside from willow, wood splints, and rattan, but primitive people make basketry of many kinds of fibers.

To answer inquiries about the Russian horticulturist I. V. Michurin, the institute named after him is writing a book in the international language, Esperanto, called "Michurin—Creator of New Plants," for distribution to 50 countries.

A government appropriation is to be used in study of pests that menace the oyster industry of the Atlantic and Gulf States.

Scientists at State College, Pennsylvania, have designed and built a tillage meter, a new apparatus for testing plows and other tillage tools.

Housewives in New York State have formed groups to study fatigue, so as to plan their work and household arrangements to avoid it.

Instead of a door between kitchen and dining tables, one new train has a curtain of moving air, which keeps the cooking odors and heat away from the diners.

Two new mountain peaks discovered by the National Geographic Society's Yukon Expedition have been named for King George and Queen Mary of England.

Although scorned by many fish eaters, carp are as edible as many varieties of gamefish when taken at the right time of the year—during the cold months—and properly prepared.

Since air conditioning is helpful in treating certain diseases, a physician suggests that new hospitals should be so constructed that air conditioning equipment may be installed later, if not economically possible at time of building.

WITH THE SCIENCES THIS WEEK

Most articles are based on communications to Science Service or papers before meetings, but where published sources are used they are referred to in the article.

ARCHAEOLOGY

By what kind of plan was the synagogue excavated at Dura built? p. 415.

What sort of wells were built by the ancient Mayas? p. 414.

ASTRONOMY

What interesting astronomical event will occur on May 11, 1937? p. 412.

Why does the moon look red during its total eclipse? p. 417.

Why is the eclipse of June 30 uninteresting to scientists? p. 416.

ECOLOGY—AGRICULTURE

How do wind and rain add to the farmer's risk? p. 413.

ENGINEERING

How can you make your home more comfortable in summer? p. 412.

Why do two new Norwegian ships have their boilers on deck? p. 419.

ENTOMOLOGY

Do we need to fear the chinch bug this year? p. 415.

MEDICINE

What special care should be given the children of allergic persons? p. 414.

What advantage has the active principle of ergot over other preparations of that drug? p. 419.

PHYSIOLOGY

How can a heart be kept alive outside the body? p. 411.

PUBLIC HEALTH

What legislation is giving a boost to public health work throughout the nation? p. 416.

VOLCANOLOGY

Why is Halemaumau Pit in Kilauea expected to erupt soon? p. 416.

PHYSIOLOGY

Lindbergh and Carrel Grow Organs Outside of the Body

Living and Functioning in a Glass Jar, Glands and Heart Will Add to Knowledge of Organic Diseases

COL. CHARLES A. Lindbergh, premier aviator, has written his name in the annals of experimental medicine, bracketed with that of Dr. Alexis Carrel, Nobelist of the Rockefeller Institute for Medical Research.

A new method of transplanting living glands or any other parts out of the body into a glass chamber, there to live for days artificially fed on a blood substitute by an ingenious Lindbergh-designed mechanical "heart," has been announced by the scientific team of Carrel and Lindbergh. (*Science*, June 21).

For the first time an entire organ has been made to live outside the body.

The Lindbergh apparatus for maintaining a sterile pulsating circulation, combined with the Carrel techniques for transplanting organs and keeping them free from bacteria, has been used in twenty-six recent experiments. The organs made to live in vitro were: thyroid, ovary, suprarenal, spleen, heart and kidney.

The organs not only continued to live but some grew and added new cells and tissues to themselves. One organ more than tripled its weight in five days.

In explaining their research on "the culture of whole organs," Dr. Carrel and Col. Lindbergh hint as to its ultimate purposes:

1. Manufacture in glass jars outside the body of the secretions of the endocrine glands.
2. The isolation of the substances necessary to growth.
3. The discovery of the differences and the functions of the body's glands.
4. The discovery of how organs affect one another.
5. The production and treatment of organic and arterial diseases in glass jars outside the body.

The suggestion that organic and arterial diseases may be first produced and then treated in healthy body parts kept alive outside the body will create great interest and hope in medical circles. Scientists find some of the most deadly of human diseases most difficult to study.

Heart diseases, kidney disorders, hardening of the arteries, and perhaps even cancer, are just a few of the "killers" among diseases that might be studied and combated by the new Carrel-Lindbergh methods.

Since glands and their secretions may create dwarfs and giants, or bring on a variety of diseases, the hope of better knowledge of the glands will also intrigue medical experimenters.

The Carrel-Lindbergh experiments mark the fulfilment of a 123-year-old hope, first expressed by the French scientist C. J. J. Le Gallois, who wrote in 1812 that "if one could substitute for the heart a kind of injection . . . of arterial blood, either natural of artificially made . . . one would succeed easily in maintaining alive indefinitely any part of the body whatsoever."

Only recently have surgical and mechanical procedures become sufficiently perfected to allow organs to be cultivated in vitro. In 1908, Dr. Carrel worked out methods in connection with organ transplantations for handling the arteries, washing the organ free from blood without injuring the cells and preventing blood clots. Then came the World War, and under the stress of necessity there were developed in Rockefeller Institute laboratories in France the antiseptic procedures that permit complete protection for tissues from bacteria in the course of surgical operations.

Then there was lacking only an apparatus capable of playing the role of heart and lungs and of keeping an organ free from infection indefinitely. Dr. Carrel began a long search for the proper apparatus.

Col. Lindbergh enlisted as Dr. Carrel's collaborator. After five years of work, during which many pieces of apparatus based on different principles were built and discarded, success was achieved.

Striking deep into the heart of medicine's great unknown areas, the Carrel-Lindbergh research follows Dr. Carrel's spectacular and important Nobel researches on tissue culture that have added much knowledge of bodily processes. Most widely heralded to the public was the achievement of keeping chicken heart tissue growing for over twenty-three years.

But the new "culture of whole or-

MILLIONS OF YEARS IN ONE PICTURE

Something rather out of the ordinary is achieved in a series of restoration paintings of ancient plants done for the Brooklyn Botanic Garden by Miss Maud Purdy under the direction of Dr. Alfred F. Gunderson. Instead of representing a mixed forest of one geologic age, Miss Purdy's paintings show plants of the same general botanical group from several different ages in one frame, making possible a bird'seye view of a considerable sector of botanical evolution. In the above picture are shown representative paleozoic gymnosperms, grandsires and greatuncles of modern pines, spruces, ginkgos, etc.

gans" is not a substitute for the method of tissue culture, Dr. Carrel and Col. Lindbergh explain. It is a new technique.

"It is not in any way a substitute for the method of tissue culture," they report. "Its techniques, as well as its purposes, are quite different. As is well known, tissues and blood cells grow like bacteria in flasks containing appropriate media. The techniques for the cultivation of tissues are somewhat analogous to bacteriological techniques, although far more delicate. But it is through the employment of complex mechanical and surgical procedures that organs are enabled to live isolated from the body. Tissue culture deals with cells as units of bodily structures; the new method, with cellular societies as organic wholes."

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ENGINEERING

Low-Priced Air Conditioning System Seen for Home Use

Key is Silica Gel, Well-Known Cheap Chemical With Extraordinarily High Water-Absorbing Ability

A STRANGE substance that looks like sand but has the power to absorb water vapor from air and which seems destined to reduce the cost of air conditioning to within reach of average home owners, was described before the meeting of the American Society of Heating and Ventilating Engineers at Toronto by W. E. Stark of Cleveland.

This substance, known as silica gel, was widely used in gas masks during the war to absorb poison gases. Until recently it was mainly a laboratory curiosity, although some of its properties have been familiar to science for many years. A new development is its use in air conditioning where it has been proved to be an ideal dehumidifier.

Each crystal of silica gel consists of hard core surrounded by many submicroscopic pores which, while invisible, reveal their presence in laboratory experiments. The air conditioning device contains silica gel reactivated by passing ordinary natural or coke gases through.

Use of the new system may result in the simplification of air conditioning systems which up to now have been confined to large buildings because of the cost of installing the required equipment. Silica gel was envisioned as playing a leading role in lowering the cost and making air conditioning available to small residences.

The water-absorbing compound is now industrially used as a purifying agent in oil processing and for removing moisture from dry ice. It is also used medically in powdered form to absorb certain poisons from the intestinal tract. Prof. Auguste Piccard carried silica gel on his stratosphere flights to keep the gondola free of moisture.

The possible use of silica gel for cheap home air conditioning systems will strike at the humidity phase of keeping comfortable. The old quip "It's not the heat but the humidity" that makes one uncomfortable has, of course, much reality. Two cities, one on the seashore and the other far inland, may both have the same temperature on a given day in summer but the one—usually the coastal city—may be more uncomfortable because the atmosphere over it contains so much water vapor. The reason is principally that moisture on the skin cannot so easily evaporate (and thus cool the body) when the surrounding air is heavily laden with moisture.

The use of silica gel which will absorb much of the existing vapor should thus be able to bring comfort in the home, not by tackling the heat side of comfort but by lowering the water content of the air. The more complete and costly air conditioning systems like those in modern theaters control bodily comfort by both methods. The air is cooled and at the same time its water content (humidity) is lowered.

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Contagious diseases are not so common among mammals as among birds.

Oil from a wild cucumber is believed to have been used by western Indians in paint which has withstood exposure for 150 years.

ASTRONOMY

Mercury's Visit to Sun May Reveal Its Atmosphere

THE QUESTION of whether or not the tiny planet Mercury, innermost member of the sun's family, has a layer of atmosphere may be settled within two years when the planet just barely skims the face of the sun on May 11, 1937.

The present conflict between observational astronomers who believe they have obtained definite evidence of such an atmosphere, and others who believe just as definitely, on theoretical grounds, that Mercury could not possibly have retained an air layer, is summarized in a note in the current issue of the *Journal of the British Astronomical Association* (May). It is signed C. O. B., which are the initials of C. O. Bartrum, secretary of the Association.

Dr. H. N. Russell, of Princeton University, and Dr. H. Spencer Jones, astronomer royal and president of the association, are named as the opponents of the atmosphere theory. On the other hand, Dr. E. M. Antoniadi, of the Meudon Observatory in France, has made observations, with a large telescope, indicating that some of its markings are frequently more or less hidden by local clouds. These observations, declares C. O. B., have been corroborated by a British amateur astronomer, Mr. H. McEwen, director of the Association's Mercury and Venus Section. Of course, if there are clouds, there must be an atmosphere, even though rarefied, to hold them.

When, at rare intervals, Mercury passes directly between the sun and earth in transit, there is an instant when the planet is half in front of, and half off, the solar disk. Then, the presence of an atmosphere may show itself by a ring of light which appears completely around the planet. The air on the edge of Mercury away from the sun would bend some of the light around it, just as the earth's atmosphere bends the sunlight so that we really continue to see the sun for a short time after it has set.

With the ordinary transit, such as last occured in 1924, there is such a brief period, at the beginning and end, when Mercury is thus at the edge of the sun, that there is little time to make any detailed observations. The transit of 1937 will not be visible from England or northern Europe, for from these parts of the earth the planet will just miss coming in front of the sun. But in southeastern Europe and all of Africa it will be seen, and there the planet will just skim along

the sun's edge, hanging there for about forty minutes. Such a transit occurs but once in nearly a thousand years, and thus it should provide an excellent opportunity of studying Mercury at leisure to see whether there is the arc of sunlight around the portion not projected upon the sun's disk.

"The presence or absence of such an arc would go a long way to settle the conflict between the planetary observers and the theoretical astronomers," says the author of the note.

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ECOLOGY—AGRICULTURE

Intensive Weather Research Valued Above Klondike Gold

Accurate Knowledge of Climatic Factors Needed For Intelligent Planning of Western Agriculture

"MORE THAN all the gold in the Klondike" was the value-estimate set on a proposed program of intensive research on weather records of the past eighty years, by Dr. Isaiah Bowman, chairman of the National Research Council and director of President Roosevelt's Science Advisory Board, in an address delivered before the American Association for the Advancement of Science.

Emphasizing the necessity for accurate and dependable scientific knowledge in the development of long-range plans for land use, if repetitions of past disasters due to drought, dust storms, erosion and floods are to be avoided in future, Dr. Bowman said:

"Neither a scientist nor a governmental official can handle the problems of the drought on a hunch. We can never solve the problems of the drought by stopping the drought. We can only provide to some degree against its effects; and if we were forewarned against its coming the degree of provision against its effects could be greatly increased. Likewise, we can never solve the problems of soil erosion by stopping erosion. We can only reduce the rate of erosion. The effects of drought and soil erosion will outlast all the regulatory schemes of today.

"Amazement at the dust storms should not lead to the neglect of long-range studies. A strong force of experts should be working on the mass of climatological data on the Great Plains accumulated during the past 50 years by the Weather Bureau. If this were done the result would certainly be more valuable over a ten-year period than all the gold produced in the Klondike."

Such a study would be invaluable in determining the location of the much-debated Great Plains shelterbelt region, Dr. Bowman suggested. Even on the basis of present imperfect knowledge, the Forest Service has already shifted the projected lines considerably to the eastward of their first proposed location.

But the immediate problem of the semi-arid western part of the Great Plains is not only where to plant more trees and shrubs, waiting twenty to thirty years for results, he continued. Even more urgently is it a challenge "to work out a land-use plan for the grasslands of the vast region west of the proposed shelterbelt and to start operating the plan now. The climatic map shows us how vast is this marginal area. . . . In two land types where risk is greatest lies the land on which in favorable years farmers are most strongly tempted to grow wheat. There the wheat farmer literally gambles on the rain.

The two types represent areas of maximum risk not because they are occasionally very dry but because they are occasionally so favorably wet as to cause agricultural overextension. To these difficulties has recently been added widespread and unexpectedly severe wind erosion. While the farmer is waiting for a return of moist years, the wind carries his farm aloft.

"The problem of the farmer turns on the question, how far can he go in reaping the bounty of the land in wet years and yet survive the penalties of inevitable drought? The problem of the government is to determine whether a man shall be allowed to grow grain in places where he can do so and ought not to."

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ENGINEERING

Miniature Manhattan In Artificial Wind

TO DETERMINE how winds stress large buildings, National Bureau of Standards scientists have built a model of the world's highest structure, New

FOR THE CITIZENS OF LILIPUT

York City's Empire State Building, and several blocks of its surrounding buildings.

Subjected to regulated and artificial breezes in a ten-foot wind tunnel, this miniature Manhattan gives information that will allow engineers to design buildings that are safe in high windstorms with due regard to least possible cost.

The 1,248-foot world's tallest structure is reduced in the model to a 5-foot height. Frequent visitors to New York will be able to pick out familiar landmarks in the model, which is viewed toward the east in the accompanying illustration.

Wind pressure is one of the important factors in designing tall buildings, radio masts, water towers and chimneys. Bureau of Standards experts hope that measurements upon the Empire State Building in natural winds will be made so that they can be compared with the model's wind tunnel results.

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MEDICINE

Supposed "Thymus Deaths" May be Due to Allergy

SUDDEN and mysterious deaths of small children, heretofore blamed on the thymus gland in the chest, may instead be due to extreme sensitiveness to an irritant of the sort that causes hay fever and asthma in adults, Dr. George L. Waldbott, of Detroit, told members of the American and Canadian Medical Associations at their recent meeting.

Dr. Waldbott based his opinion on changes found in the thymus glands and other organs after the deaths of children who died a so-called thymic death. These changes were strikingly similar to those found in infants that had suffered from asthma known to be due to supersensitiveness.

Enlargement of the thymus gland cannot be considered a result of the supersensitiveness, or allergy as it is termed medically. Persons with hay fever and allergy, Dr. Waldbott pointed out, do not as a rule have enlarged thymus glands, nor do children with the enlarged gland show symptoms of supersensitiveness. He therefore suggested that the enlarged gland may be a "pre-allergic" phenomenon.

During this "pre-allergic" state the body apparently has not a sufficient defensive force for fighting an invasion of irritating foreign substances, Dr. Waldbott suggested in explanation.

No effective treatment is known for the condition, but preventive measures offer some hope of warding off these deaths, Dr. Waldbott said. If they are really due to allergy, then any child whose parents have such an allergic condition may be expected to develop it, because such supersensitiveness seems to be hereditary.

Such children should be guarded against exposure to all the things that can cause hay fever or other allergic attacks, Dr. Waldbott advised. These include weeds, face powder, chilling, over-heating, and taking of foods or drugs to which they may be sensitive.

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Sigillography is the science of deciphering and interpreting seals.

ARCHAEOLOGY

Ditch In Guatemala Reveals Ancient Well

DISCOVERY of an orange-red pottery well, from which thirsty Maya Indians drew water centuries ago, is announced by Oliver G. Ricketson, Jr., of the Carnegie Institution of Washington. (*Maya Research*, April).

The ancient well, which shows how ingenious Mayas stored water, was unearthed at Quirigua, Guatemala, where one of the Mayan cities was located. It consisted of a pipe of pottery which led down to a big pottery water jar. The jar was buried in stones and sand and served as a cistern. Holes in the jar below the water table permitted free entrance of water.

In the bottom of the jar the archaeologist found a used mano, or grinding stone, which suggests that some Indian woman lost it down the well.

The well was discovered when Mr. Ricketson was informed by Floyd Avery that several large pottery tubes had come to light during ditch digging on Quirigua Farm.

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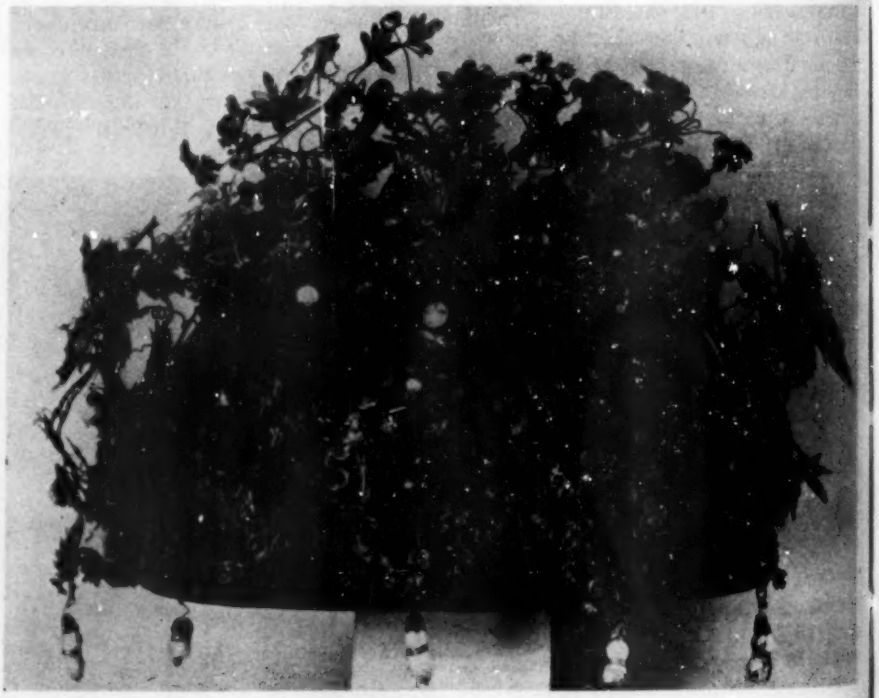

A CROWN AND A CORNERSTONE

Phoenixes and jeweled flowers tremble lightly on this gorgeous crown, believed to have been worn by a Chinese empress almost a thousand years ago. The imperial crown has come to New York, to the Metropolitan Musum of Art, where Alan Priest enthusiastically predicts that "it is, I think, bound to become the cornerstone and foundation of the study of Chinese jewelry, for today it has no known rival." Aside from Korean crowns, it is believed the only complete early crown to have come out of China. Five phoenixes, each dangling a pearl tassel from its beak, are ranged in front. Above is an airy mass of flowers with centers of pearl, uncut ruby, or cat's-eye among which fly birds and butterflies.

ARCHAEOLOGY

Painted Roman Shields Show Amazons Through Eastern Eyes

THREE PAINTED wooden shields, carried by Roman soldiers stationed at the outpost of Dura on the Euphrates, have been unearthed at the ruined city, to become new and important evidence in the history of early Bible art.

Prof. Clark Hopkins, field director of the Yale expedition which is in its eighth season of digging at Dura, announced the discovery to the University.

The soldiers' wooden shields are painted with a scene of battle between Greeks and Amazon warriors, the Trojan horse episode, the sack of Troy by the Greeks and other warlike pictures. It is the art style, however, rather than the subjects, which impresses Prof. Hopkins.

The familiar subjects of the classics are painted with strong Eastern influence. The fronting of the human figures, the pose of the horses in a Parthian gallop, even the fashions of the clothes, are all Eastern.

Not Confined To Religion

This warlike and secular art on the shields of unknown Roman soldiers helps explain a puzzling feature of third century Christian art and Jewish religious art, which was a major discovery at Dura in previous expeditions. The Bible scenes painted on walls of a Christian chapel and a Jewish synagogue, at Dura, revealed this same Eastern atmosphere.

"But in neither building," said Prof. Hopkins, "was it clear whether this was an addition made at Dura, or whether this element was inherent in the eastern artistic tradition of the Old and New Testament. With the shields before us, it seems much more probable that we should subtract, at least in part, this Eastern influence from purely Christian and Jewish tradition."

Excavations at the Jewish synagogue, dating from 244 A.D., have been continued, Prof. Hopkins stated, and a smaller, older synagogue has been found beneath its foundation.

"Beneath the chief room, an earlier room was disclosed, smaller but similar in shape and arrangement," Prof. Hopkins reported. "It was oriented as the later building, possessing two entrances, the middle one for the men, the smaller one for women. It was furnished with a bench around the walls and contained apparently a niche, (the Torah shrine) in the middle of the west wall. A new feature was the small antechamber in front of the women's entrance.

"Portions of the mural decorations remained, geometric designs in bright colors. Fragments of fallen plaster showed that the walls of this early synagogue bore only geometric designs, that the ceiling was decorated with circles and octagons in which were set gilded rosettes and that the antechamber had been adorned with representations of fruit and flowers.

"Obviously, therefore, the early building contained no human or animal figures, perhaps because the smaller community could not afford more elaborate decorations, more probably because at this period, regulations against human and animal images were more strict. More interesting also was the fact that the early synagogue with antechamber and court formed only one part of a larger complex which followed very closely the plan of a private house. It will be recalled that the Christian church had also the general form of a private house, possibly for the purpose of concealment."

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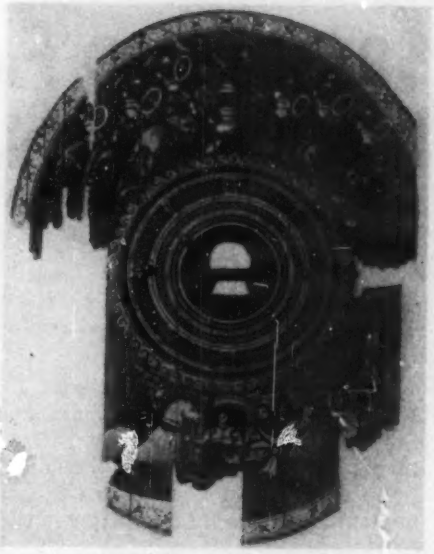
ENTOMOLOGY

Chinch Bug Threat Reduced By Rain and Cool Weather

CHINCH bugs have taken "an awful licking" from the weather this spring, summarized reports from the major grain-raising areas indicate. They throve on the drought and heat of the past few summers; until last fall they were regarded by Bureau of Entomology scientists as the greatest single danger to this year's crops, among insect enemies. But persistent rain and cool weather have immobilized them, and have even reduced their numbers appreciably in parts of the Grain Belt.

Wheat, oats and other small grains are now safely out of their way, and in some sections it appears highly probable that the chemical-warfare control methods for which farmers and official agencies have been preparing will not need to be used after all for the protection of the corn crop.



SIEGE OF TROY—EASTERN STYLE
The wooden horse trick, which got the Greeks inside the walls of Troy, and the sack of the city which followed are painted on this Roman shield in an unusual art style. An Eastern artist, third century A. D., must have painted the classic scenes, judging by details such as Near Eastern costumes, and the facing of the bodies to the front. Courtesy Gallery of Fine Arts, Yale University.

The last great spread of chinch bugs occurred about forty years ago, during the great drought of the early nineties. When normal moisture and temperature conditions returned, the bugs retreated. It is expected that if the present more nearly normal weather continues, the experience of that earlier generation will be repeated, and that the central, northern and eastern grain-raising regions will again be free of chinch bugs.

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PHOTOGRAPHY

Photo-Mural Depicts Science and Engineering

See Front Cover

THE interesting view of a bridge appearing on the front cover of this week's SCIENCE NEWS LETTER is from one panel of a series of photo-murals recently displayed at the Science Fair of the American Institute. This panel is entitled "Engineering."

The entire work on the photo-murals, from negative to final panel was done by members of the Experimenters' Club of DeWitt Clinton High School, New York City.

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Leprosy reached the United States from both Europe and Africa.

PUBLIC HEALTH

$8,000,000 Fund to be Used In Guarding Nation's Health

A PROGRAM for spending $8,000,000 for the promotion and protection of the health of the nation has been formulated by state and Federal public health officials.

The $8,000,000 fund is expected to be provided by Congress in connection with the Social Security bill just passed. It will allow the local communities of the nation to go ahead with needed health programs to an extent never before possible.

The bill provides that the funds are to be allocated by the U. S. Public Health Service to the various states on the basis of three factors: population, special health problems, and financial needs. When an allotment is made to a state, the funds may then be given out when the state meets certain requirements with regard to health services rendered the public and the matching of Federal funds by the state legislatures.

In preliminary discussion of the program, the health officers emphasized the need for the selection of personnel on the basis of ability, training, and professional standing. Appointments on a political basis will be avoided, it was indicated.

The training of personnel to administer the public health work is one of the problems to be met, and may be aided by the new Federal funds. It will be possible for state health officers to select promising young professional men and women and send them to universities to receive advanced training for this type of work.

Members of the conference indicated that the money, if received, will be expended slowly and with care; returning part of the fund to the treasury if necessary in preference to hasty, unwise spending.

Half of the $8,000,000 fund, or $4,000,000 will be allocated to the states on a per capita basis. Of this amount, one half will be used to match, dollar for dollar, existing appropriations and the other half will be used to match new appropriations that may be made by state legislatures as a part of this expanding health program.

Another thirty per cent. of the total fund, $2,400,000, will be devoted to an attack on the special health problems of individual states, including the training of personnel so that they will be competent to handle them. The hookworm of the southern states, and the malaria of mosquito-ridden regions are among the special problems that this fund will be used to combat.

Since properly trained personnel is one of the major problems in a battle of this sort, one half of this $2,400,000 fund will be devoted to the establishment of suitable training centers and the payment of the expenses of young professional men and women to fit them for this work.

Allocation of the remaining $1,600,000 will be on the basis of financial need. A small part of this amount, $400,000 will be distributed equally to all the 51 states and territories. The remainder, $1,200,000, will be used for aiding those states least able to provide funds for adequate health service.

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ASTRONOMY

Rare Solar Eclipse Ends In Month Before It Starts

AN ECLIPSE of the sun that begins the month after it ends is the paradoxical event which will happen on June 30. If you happen to be at a point in northeastern Siberia, at latitude 59 degrees 56 minutes north, and longitude 124 degrees 35 minutes east, on July 1, at the time your watch, set to standard time for that part of the world, indicates 2:34 a. m., the sun will rise. As it does so, you will soon notice that a small piece is nicked out of the edge, as the moon is starting to pass in front of it.

But Siberia is rather inaccessible, so instead you may prefer a point in the Atlantic Ocean, north of the Canary Islands, at latitude 46 degrees 43 minutes north and longitude 23 degrees 19 minutes west, not far from the paths of some trans-Atlantic steamers. If you are there on the late afternoon of June 30, you will also see the sun covered by the moon. If your watch is set to the proper standard time, as it reads 7:25 p. m., the sun will be setting, and the moon will be just at that moment passing from in front of the sun. This will bring to an end the partial solar eclipse that you might have seen start in Siberia early the next morning, and the next month!

The paradox of the times of this eclipse is about the only thing to make it of more than passing interest. At no time, as seen from any part of the earth, will the moon completely cover the sun, producing a total eclipse. It is only at the time of a total eclipse that the astronomers can make the observations for which eclipse expeditions are often sent half way around the earth. Even where the coming eclipse is seen at its height, less than a third of the sun's diameter will be covered. In addition to northern Siberia, it will be seen from the British Isles, Norway, Sweden, Greenland, Iceland and the north pole.

Science News Letter, June 29, 1935

VOLCANOLOGY

Halemaumau, Lake of Fire, Expected to Erupt Soon

HAWAII'S most awesome volcanic spectacle, the great lake of fire in Halemaumau Pit, in Kilauea volcano, is expected to burst into eruption at any moment. So says Supt. Edward G. Wingate of Hawaii National Park.

Volcanologists had predicted an eruption to occur at about the time of the spring equinox, based upon previous cycles of volcanic activity and current indications such as earth tremors. The expected eruption did not materialize as scheduled, but the great volcanic pit is showing continuous activity and the indications are that the lake of fire may be expected to return soon to the crater.

The walls of Halemaumau are sliding daily, sometimes as separate rocks, sometimes in large masses. Meanwhile a solfatara, or small, geyserlike formation at the foot of the west wall, is pouring out blue fumes and is increasing in area and in brilliancy of color. The majority of the tremors recorded on the seismograph of the Volcano Observatory located on the rim of the crater are originating beneath or close to Kilauea.

The last eruption of this world-famous volcano, which began on September 6, 1934, resulted in the lake of fire remaining in the firepit for over a month. An interesting feature of that activity was the issuance of burning lava from vents in the walls which resulted in fire walls of molten lava cascading down 500 feet of the crater walls.

Science News Letter, June 29, 1935

ASTRONOMY

The Moon Veils Her Face

Total Eclipse is Visible Generally Over the United States on July 15; Sun at Greatest Distance Away

By JAMES STOKLEY

THE FIRST total eclipse of the moon visible generally over the United States since November 27, 1928, is the most striking celestial event scheduled for July. This happens during the night of Monday, July 15. At 10:12 p. m., eastern standard time, the moon, moving continually through the sky from west to east, begins to enter the shadow of the earth, and at 11:09 it will be completely immersed in it, thus beginning the period of total eclipse. At midnight the eclipse will be at its height, and the moon will be farthest in the shadow. At 12:50 a. m., the total eclipse will be over and the moon will start to emerge from the shadow, being completely uncovered at 1:47 a. m.

An eclipse of the moon is not of great scientific importance, but is very interesting to watch. It has the great advantage over a total eclipse of the sun in being visible from more than half the earth. When the moon passes between earth and sun, producing a total eclipse of that body, there is at best only a narrow strip a hundred or more miles wide and several thousand miles long, where the sun can be seen completely covered. But when the moon enters the earth's shadow, as it does this month, the moon can be seen eclipsed from any place where it can be seen at all.

Reflection Only

The moon has no light of its own, but is illuminated by the sunlight falling upon it. When this supply of light is cut off, by the earth passing between sun and moon, our satellite shines with far diminished splendor. It does not darken completely, but assumes a curious copper-red color. This is a result of the bending of the sun's light by the earth's atmosphere. It is well known how the bottom of a basin looks higher when filled with water than when empty, because the rays of light from the bottom are bent downwards as they leave the dense water for the more rarefied air. As the light from the sun passes through the atmosphere, which is considerably denser than the vacuum of inter-planetary space, it is similarly bent around the earth's curve. As a result most objects in the sky, all those except one directly overhead, appear higher than if we saw them from an airless planet. For the same reason we continue to see the sun for a few minutes after it has actually gone below the horizon.

As a beam of sunlight passes through the earth's atmosphere, some of the blue rays are extracted from it, and reflected to the surface as the blue color of the sky. The light that goes on through, its blue removed, is predominantly red, so that the setting sun often looks red, when the light from it that reaches our eye has to penetrate a greater thickness of air than at noonday. But the light that continues through, and is finally bent around into the earth's shadow, has had to pass through just twice as great an amount of air as that which comes to us at sunset, and the reddening is still more marked.

Seen During Eclipse

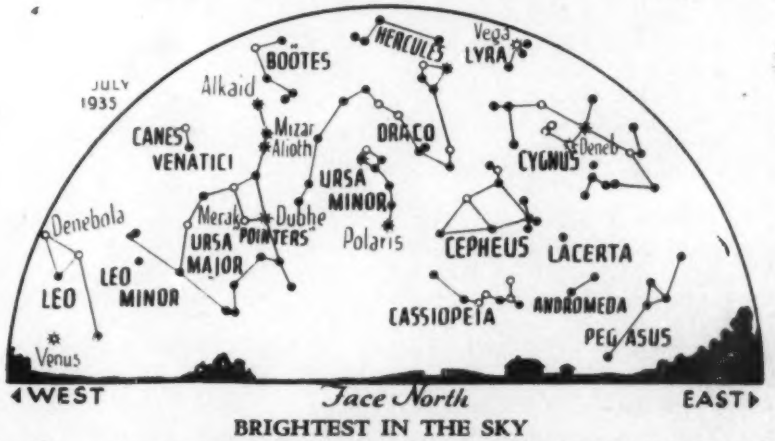
Ordinarily, of course, we cannot see this red light, because there is nothing in the earth's shadow to reflect it. At the time of a total eclipse of the moon it is sent back to us, and so the eclipsed moon appears of the peculiar ruddy hue that must have been so startling to the primitive people who saw it, and thought the moon was being devoured by some great dragon.

Even though the earth's shadow is not entirely dark, it has a rather sharp boundary, and it is interesting to watch the progress of the moon while entering it. On July 15, between 10:12 and 11:09 p. m., the shadow will be seen gradually covering the moon, and it will be found noticeably curved. From 12:50 to 1:47, the curved edge of the shadow can again be seen on the moon, as the eclipse is coming to an end. This, of course, is an excellent proof that the earth really has the shape of a sphere, for there is no other geometrical figure that could always cast a circular shadow.

The eclipse on the 15th will be the fifth of the year, the second and last of the moon. The first of the moon was on February 19, but was invisible in the United States except in the far west. Eclipse number six of 1935, a year when there occur the greatest possible number, seven, also happens this month. On July 30, the moon will come partly in front of the sun, but to see it one will have to go to a small region near the Antarctic Circle in the south Atlantic Ocean. Even there, less than a quarter of the sun's diameter will be covered, and the sun will be low in the sky when it happens, so that few people will observe it. The final eclipse of the year will be another of the sun, occurring on Christmas day.

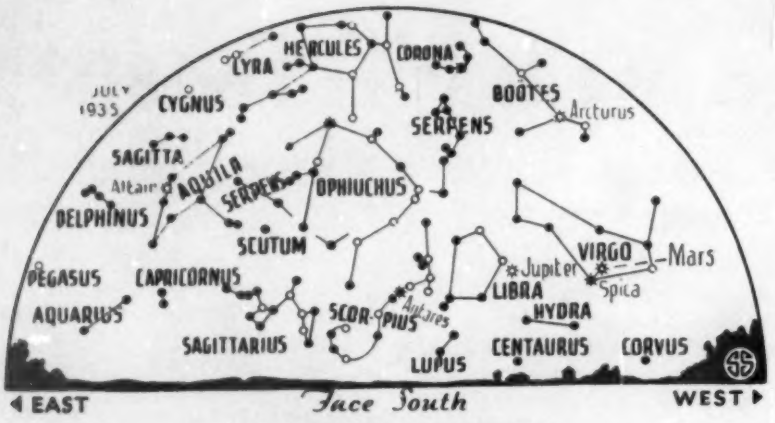
Earth's neighbors in space, the planets that travel around the sun with us to

✲ ✱ ○ • SYMBOLS FOR STARS IN ORDER OF BRIGHTNESS



BRIGHTEST IN THE SKY

But drawing quickly nearer the sun where its brilliance will be dimmed is the planet Venus. If you wish to see it in daylight, look in the west on the afternoon of July 4. There it will be just a little north of the crescent moon.



SUMMER AMONG THE STARS

With the short nights and hot days, summer also brings us characteristic formations in the skies. In the south you may now see the great Scorpius with the red star Antares marking the animal's heart.

form the solar system, have been well placed in the evening skies during recent months, and the display continues during July. Though Mercury cannot be seen, Venus still shines in the west after sunset, and is still increasing in brilliance as it comes closer the earth. On July 1 it will be 64,888,000 miles from us, but on the 31st it approaches within 54,227,000 miles. Its magnitude is minus 4, far greater than any other star or planet, so that it can even be seen in broad daylight if you know where to look. On July 4 the moon, in a crescent phase, passes a short distance to the south of Venus, and this might help in locating it before sunset.

Mars, on the other hand, is drawing away from the earth. When we see it in the southwestern sky at the beginning of the month, it is just a little nearer than the sun, at a distance of 93,882,000 miles, but on the 31st it will have receded to 111,970,000 miles. It is, however, still fairly bright, as its magnitude is plus 0.4, greater than that of any star now in the sky except Vega and Arcturus. The motion of Mars through the sky will be easily seen this month, as it passes the star Spica. On the first it will be well to the west of the star, but at the end it will be even farther to the east.

Second Brightest

Jupiter is the second brightest planet, with a magnitude of minus 1.8. Its distance does not change greatly this month from its distance of 458,260,000 miles on the 15th. Saturn, which is high in the southeast at midnight, is considerably fainter, of magnitude 1, and 666,920,000 miles from the earth.

An eclipse of the moon can occur only at the time it is full, while one of the sun must be at new, so these phases occur respectively on the 15th and 30th. The times of first quarter and last quarter are July 8 and July 22. On July 5 the moon is at apogee, when farthest from the earth, 251,650 miles away. Perigee, when it is closest, comes on the 17th with an approach of 224,850 miles.

On the evening of July 12 the moon eclipses the star Antares, in Scorpius. At 9:44 p. m., eastern standard time, as seen from Washington, the star will hide behind the dark edge of the moon, which will then be in a gibbous phase, about half way between first quarter and full. The star will reappear at 9:44 p. m. For other parts of the country, the times will be different. People in the far west will not see the occultation at all, for by the time they see the moon rise, it will be over. The disappearance of the star will be interesting to watch, especially with a small telescope, for as it passes behind the dark lunar edge, it will vanish instantaneously. This demonstrates that the moon has no atmosphere. If it had, the star would gradually dim as its light passed through a greater thickness of atmosphere.

Sun Farthest Away

Not only does the distance of the earth and the moon change, but so does that of the earth and sun, over the course of the year. Last January we were nearest the sun, now our planet is several millions of miles farther from it. Aphelion, the time when we are most distant, will happen on July 4, at 9:00 p. m., eastern standard time, when we shall be 94,450,000 miles away. This causes a slight reduction in the intensity of the sun's light and heat reaching the earth at present. But for us in the northern atmosphere, the sun is much higher in the sky than in winter, and so it is more concentrated as it falls on North America. Despite the sun's greater distance, therefore, we are having summer.

During July the evening skies wear their characteristic summer appearance. In the south the scorpion appears, with the star Antares, red in color, marking the animal's heart, and the vertical curved row of stars to the right its claws. The position is shown on the accompanying maps, which depict the skies as they appear at about 10 p. m., standard time, on July 1, 9:00 p. m. on July 15, and 8:00 p. m. on July 31. Next to Scorpius, to the west, is the group of Libra, the scales, not conspicuous in itself, but easily found at this time because of the presence in it of the bright planet, Jupiter. Farther west is Virgo, the virgin, in which the planet Mars now shines, close to the star Spica. On the other side of the scorpion is Sagittarius, the archer, whose shape resembles that of a teapot, the spout to the right, and the handle to the left.

Dippers, Big and Small

The most brilliant planet in the evening sky is Venus, but it is rapidly drawing nearer to the sun, and the period through which it remains above the horizon after sunset is daily growing shorter. Venus is in the constellation of the lion, Leo. Next to this group, to the north, is Ursa Major, the great bear, of which the well-known "Great Dipper" is part. This implement hangs in the northwest, the handle upwards. By following the "Pointer," the two stars at the bottom of the bowl, over to the right, one comes to Polaris, the pole star, in the "Little Dipper," which, in turn, is part of the little bear, Ursa Minor. On the opposite side of the lesser bear is Cepheus, the king of Ethiopia, and below is the W-shaped group of Cassiopeia, representing his queen.

High in the eastern sky one can now see Cygnus, the swan, sometimes called the "Northern Cross," which is lying on its side. The brightest star in this group, Deneb, is to the north, and marks the top of the cross. Directly above Cygnus appears the brightest star visible in the summer time from most of the United States, Vega, in the constellation of Lyra, the lyre. A little farther south, and lower, is another brilliant star, Altair, in Aquila, the eagle, which can be recognized because of two fainter stars, one just above Altair, the other about the same distance below.

The constellation of Boötes, with the famous Arcturus as its most brilliant star, shines high in the southwest. A

good way to locate this star is to imagine that the curve of the handle of the Great Dipper extends around to the south, and you come right to it. Between Boötes and Lyra appear two constellations that are easily seen in the summer evenings, because they are almost directly overhead. One is the semi-circle of stars forming the northern crown, Corona Borealis, and the other, larger and more prominent, is Hercules, the famous strong man of mythology. Just below him is another giant, Ophiuchus, the serpent carrier, sometimes identified with the famous physician of antiquity, Aesculapius. The serpent which he holds is divided into two parts, one to the east, between Ophiuchus and Aquila, the other to the west, near Boötes.

Low in the east may be seen part of the constellation of Aquarius, the water carrier. Later in the evening, as the earth turns in its daily motion from west to east, it rises entirely into view, and in it can be seen the fourth planet of the July evenings, Saturn. Pegasus, the winged horse, is north of Aquarius bearer.

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MEDICINE

New Drug May Save Lives Of Mothers in Childbirth

LIVES of mothers in childbirth may be saved by means of ergotocin. Ergotocin is the newly isolated active principle of ergot, old-time childbirth medicine. For their research leading to its isolation in crystalline form, Drs. F. L. Adair, M. Edward Davis and associates, of the University of Chicago, received the gold medal award of the American Medical Association.

A very small amount of ergotocin injected into the veins will stop dangerous bleeding following childbirth. Because the new substance is poisonous only in enormous doses, it may also be given by mouth if the emergency is not acute. Besides checking bleeding, the new drug hastens contraction of the uterus. For this reason Drs. Adair and Davis believe it should be given routinely for a few days following childbirth.

Other preparations of ergot have been used to check bleeding and to hasten contraction, but results have not always been satisfactory because the amount of the previously unknown active substance in ergot preparations varied.

Besides isolating the active principle of ergot, the Chicago scientists have obtained its chemical formula and are "on the verge" of preparing it synthetically.

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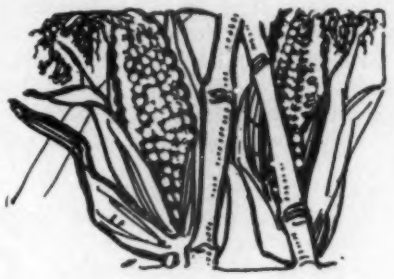
HISTORY OF AGRICULTURE

NATURE RAMBLINGS
by Frank Thone



A Corridor For Corn

CORN, tobacco, other Indian crops of pre-Columbian times: how did they get into eastern America?

To this riddle, one of the most baffling in the history of agriculture, Dr. Melvin R. Gilmore of the University of Michigan Museum offers an answer. Over the arid belt that separates the moist, arable lands of the eastern United States from Mexico, an earlier home of Indian agriculture, there stretches in one place a narrow zone of land where primitive agriculture was possible.

This "Gilmore corridor" consists of a belt of oak-hickory forest that reaches westward along the scarp of the Edwards Plateau almost to Del Rio on the Rio Grande, linking this region with the mountain valleys of eastern Mexico where there was rainfall enough to invite agriculture, and toward the east widens out into the southeastern and middle-eastern woodlands and the tall grass region of the Plains where cultivation was no longer precarious.

The Jamestown settlers and the Pilgrims found Indians cultivating corn, beans, squashes, pumpkins and tobacco along the Atlantic coast; and the French missionaries and explorers found inland Indians farming by much the same method. In the Southwest, the exploring Spaniards found the Pueblo tribes growing corn by an entirely different method, using irrigation. Without much question, both types of cultivation had come from Mexico, where agricultural civilizations were older and more advanced than they were in the North. If corn did not originate in Mexico, it certainly at least passed through that country.

The northwesterly migration of corn culture went into progressively drier lands, so that irrigation had to be practiced. But the tribes of the central Texas area lived in a land that was moist enough to grow trees, and hence easily moist enough to grow corn. The "Gilmore corridor" was a narrow bridge, but it sufficed for the introduction of corn-beans-pumpkin agriculture to the Indians of the tall grass prairies and the Eastern woodlands.

The proposal to give the name "Gilmore corridor" to this one place where a fairly rich woodland outflanks the arid plains and plateaus of the Southwest originated with Dr. Dmitri Borodin, Russo-American plant physiologist now working as a guest of the Biological Laboratory, Cold Spring Harbor, New York.

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ENGINEERING

New Freight Ships Have Boilers On Deck

BOILERS on deck, instead of in the conventional position in the hold, characterize two new Norwegian coal-burning freight ships recently put into service on an African route. (*Umschau*, May 19).

While the main idea was to gain more cargo space in the hold, several other advantages have developed. The "black crew" is delivered from the infernal heat of the ordinary stokehold in the tropics. Unloading ashes is no longer a problem: a slanting pipe simply discharges them into the sea as fast as they are raked out. Getting the boilers away from the bottom of the ship has done away with the rapid rusting of the bottom plates, always a troublesome factor in steamship operation.

Finally, officers declare that the ships behave much better in a rough sea, even when running empty or only partly laden, than do ships of like tonnage with the boiler weight far down on the keel.

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First Glances at New Books

Chemistry

CHEMICAL INDUSTRY'S CONTRIBUTION TO THE NATIONS 1635-1935—Williams Haynes and Edward L. Gordy, Editor — *Chemical Industries,* 176 p., Paper $1, Cloth $2. A valuable record of chemical accomplishment, including an index of chemicals made in America. Color portraits of John Winthrop, Jr., founder of the American chemical industry and of Francis P. Garvan, who as president of the Chemical Foundation inspired America's post-World War chemical development, are upon the two covers. The text consists of articles devoted to leading concerns and institutions of the industry.

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MEDICINE

ONCHOCERCIASIS, WITH SPECIAL REFERENCE TO THE CENTRAL AMERICAN FORM OF THE DISEASE—R. P. Strong, J. H. Sandground, J. C. Bequaert and M. M. Ochoa—*Harvard U. Press,* 234 p., $5., cloth, $4, paper. This beautifully and profusely illustrated monograph is a report of the Harvard University investigations of an important tropical disease. Too technical for lay reading, but valuable and interesting to specialists in tropical medicine and related fields.

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Statistics

TREND ANALYSIS OF STATISTICS; THEORY AND TECHNIQUE—Max Sasuly—*Brookings Institution,* 421 p., $5. Text on the analysis of statistical data to discover trends. Designed primarily for use in the social sciences, the author feels that it will likewise be of use in engineering and physics or anywhere else when one deals with ordered sets of data.

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Ornithology

WILD BIRDS AT HOME—Francis Hobart Herrick—*Appleton,* 367 p., $4. Intimate studies of birds, built around close observations of their nesting habits and family life. The descriptions and discussion range all the way from robins and cedar waxwings to whippoorwills, ducks and gulls.

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Anthropology

ABORIGINAL POPULATION OF NORTHWESTERN MEXICO — Carl Sauer—*University of California Press,* 33 p., map, 35c. Disagreeing with low estimates of native population in this country, Prof. Sauer makes a study of one particular area, and gives his verdict that northwestern Mexico had in excess of half a million Indians in its aboriginal state. His estimate is based not merely on Spanish historical documents, but also on the "static economic qualities of the area," and on archaeological evidence.

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Gardening

ENCHANTED ACRE — Gove Hambidge—*McGraw-Hill,* 344 p., $2.50. A man who gave up a desk job and took his family out into the country to make a living off a little land tells about it. He shows himself a true countryman, for he can love the land and take keen interest in working it, without indulging in sentimental illusions about it.

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Economics

THE SCIENCE OF ECONOMY—Ludwig Kotany—*Putnam,* 719 p., $3.50. To the new kind of economic theory expressed in this sizable volume, various scientific developments, relativity and time, evolution, geology, medicine, anthropology, archaeology, economic history, etc., contributed. Dr. Kotany died while the book was in press. He combined a Viennese training in mathematics with a financial career in St. Louis.

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Education

EDUCATION ON THE AIR, FIFTH YEARBOOK OF THE INSTITUTE FOR EDUCATION BY RADIO — Josephine H. MacLatchy — *Ohio State University Press,* 366 p., $3. Full of information and comment, the more than forty reports, essays and discussions contained within this volume furnish a broad cross section and evaluation of educational radio today. In addition to the discussion of broadcasting in the regular school programs, there is consideration of the way in which educational stations and programs are operating. The papers on research in the techniques and psychology of education by radio are also important and illuminating.

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General

THE NEW INTERNATIONAL YEAR BOOK, 1934—Ed. by Frank H. Vizetelly—*Funk & Wagnalls Co.,* 761 p., $6. The International Year Books are always interesting as a record of problems and achievements of another year gone. But the chronicle of the Year 1934, the New Dispensation and of the Great Debate, is fascinating beyond all other of recent decades. For this reason, as well as merely to keep your set up to date, this new volume is to be especially valued.

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Chemistry

CHEMISTRY IN THE SERVICE OF SCIENCE—A. T. Lincoln—*Chemical Foundation,* 30 p. Free. A summary of chemistry's achievements and possibilities distributed by the Chemical Foundation as No. 5 of its "The Deserted Village" series of pamphlets.

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Mineralogy—Engineering

THE STORY BOOK OF OIL—Maud and Miska Petersham; THE STORY BOOK OF COAL — Maud and Miska Petersham; THE STORY BOOK OF IRON AND STEEL—Maud and Miska Petersham; THE STORY BOOK OF GOLD—Maud and Miska Petersham, 32 p. each, 60c each; THE STORY BOOK OF EARTH'S TREASURES—Maud and Miska Petersham—*John C. Winston Co.,* 128 p., $2.50.

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Science

ANNUAL REPORT OF THE BOARD OF REGENTS OF THE SMITHSONIAN INSTITUTION . . . 1933—*Govt. Print. Off.,* 476 p., 70c. In addition to administrative reports, there is the usual appendix of some 20 notable scientific papers from a variety of sources, each worthy of permanent recording in this manner.

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Paleontology

LA PALÉONTOLOGIE ET LES GRANDS PROBLÈMES DE LA BIOLOGIE GÉNÉRALE—VOL. III—REMARQUES SUR L'EVOLUTION DES DENTS MOLAIRES CHEZ LES MAMMIFÈRES — Etienne Patte—*Hermann et Cie., Paris,* 47 p., 12 fr.

Science News Letter, June 29, 1935